— APPENDIX A—

Species List

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

PN-6540
ENV-7.00

AUG 23 2000

MEMORANDUM

To: State Supervisor, U.S. Fish and Wildlife Service
2600 SE 98th Avenue, Suite 100, Portland OR 97266

From: J. Eric Glover
Area Manager

Subject: Request for List of Threatened and Endangered Species - Endangered Species Section 7 - Bureau of Reclamation's Rogue River Basin Project, Talent Division, OR

The Bureau of Reclamation (Reclamation) is proposing to enter into Section 7 consultation regarding the operation and maintenance of irrigation facilities within Reclamation's Rogue River Basin Project, Talent Division. The facilities included in this consultation are operated and maintained by the Talent, Medford and Rogue River Valley irrigation districts. Irrigated lands served by these districts are located in and around the Medford area and total about 35,000 acres. There are an extensive network of reservoirs, canals, and diversion facilities utilized to bring water to the districts' irrigated crop lands.

Many of the facilities currently used by the Talent, Medford and Rogue River Valley districts were originally constructed in the early 1900's by private parties. The Federal government became involved in the 1950's and 60's when Congress authorized Reclamation to conduct rehabilitation, enlargement, and extension of the existing water diversion and delivery facilities. A general description of the three districts, including facilities discussion, development history, and project benefits, is attached. A facilities location map is also included for your information.

Operation of the three irrigation districts along with a large component of non Federal irrigation in the Rogue River basin, affect stream flows. These effects will be described in the biological assessment to the extent possible. Since the project lands and water delivery facilities are spread over an expansive area of the Little Butte Creek and Bear Creek drainages (Rogue basin) and the upper Klamath basin drainages, we ask that your ESA species list cover the townships listed below, recognizing that the project features actually encumber a much reduced land and water area as shown on the location map. Project features of the three districts encompass parts of the following townships:

Jackson County: T36S: R2W, R1W, R1E, R2E, R4E
T37S: R2W, R1W, R4E
T38S: R2W, R1W, R1E, R3E, R4E
T39S: R1W, R1E, R2E, R3E, R4E
T40S: R2E, R3E

Klamath County: T36S: R5E

We are sending a similar ESA species list request to the Ecosystem Restoration Office in Klamath Falls. We would appreciate receiving the ESA species list at your earliest possible convenience. Please send your response and any other correspondence related to this request to me at the above address with a copy to: Bureau of Reclamation, Attention-PN 6540, 1150 North Curtis Road, Suite 100, Boise ID, 83706-1234. If you have any question during the course of this review, please contact Mr. Richard Prange at (208) 378-5031.

Sincerely,

J. Eric Glover
Area Manager

Attachments - 2

bc: PN-6540, BFO-6100
(w/attachments)

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

PN-6540
ENV-7.00

AUG 23 2000

MEMORANDUM

To: Project Leader, Ecosystem Restoration Office, U.S. Fish and Wildlife Service
6600 Washburn Way, Klamath Falls OR 97603

From: Eric Glover
Area Manager

Subject: Request for List of Threatened and Endangered Species - Endangered Species Section 7 - Bureau of Reclamation's Rogue River Basin Project, Talent Division, OR

The Bureau of Reclamation (Reclamation) is proposing to enter into Section 7 consultation regarding the operation and maintenance of irrigation facilities within Reclamation's Rogue River Basin Project, Talent Division. The facilities included in this consultation are operated and maintained by the Talent, Medford and Rogue River Valley irrigation districts. Irrigated lands served by these districts are located in and around the Medford, Oregon area and total about 35,000 acres. There are an extensive network of reservoirs, canals, and diversion facilities utilized to bring water to the districts' irrigation crop lands. Some of these facilities are located in the Klamath Basin and some project water is conveyed by transbasin transfer to the Rogue River Basin Project.

Many of the facilities currently used by the Talent, Medford and Rogue River Valley districts were originally constructed in the early 1900's by private parties. The Federal government became involved in the 1950's and 60's when Congress authorized Reclamation to conduct rehabilitation, enlargement, and extension of the existing water diversion and delivery facilities. A general description of the three districts, including facilities discussion, development history, and project benefits, is attached. A facilities location map is also included for your information.

There are two streams in the Klamath River drainage where runoff is captured in reservoirs for irrigation use in the Rogue River basin. Fourmile Creek drains naturally into Upper Klamath Lake. It is impounded by Fourmile Dam and the stored water is moved across the Cascade Range divide for use by the Medford and Rogue River Valley ID's. Likewise, Howard Prairie and Hyatt reservoirs store runoff in the upper Jenny Creek drainage. This storage is conveyed across the divide for use by the Talent ID. Jenny Creek flows into Iron Gate Reservoir on the Klamath River.

As a result of these transbasin water transfers, we are requesting that your office provide a listing of ESA species found in the Klamath basin that could potentially be affected. We would appreciate receiving the subject list at your earliest possible convenience. Please send your response and any other correspondence related to this request to me at the above address with a copy to: Bureau of Reclamation, Attention-PN 6540, 1150 North Curtis Road, Suite 100, Boise ID, 83706-1234. If you have any questions during the course of this review, please contact Mr. Richard Prange at (208) 378-5031.

Sincerely,

J. Eric Glover
Area Manager

Attachments - 2

bc: PN-6540, BPO-6100 (all wo/attachment)
Mark Buettner, Klamath Basin Area Office (w/attachments)

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

PN-6540
ENV-7.00

AUG 23 2000

Mr. Garth Griffin
Protected Species Branch
National Marine Fisheries Service
525 NE Oregon Street, Suite 500
Portland, OR 97232

Subject: Request for List of Threatened and Endangered Species - Endangered Species Act, Section 7 - Bureau of Reclamation's Rogue River Basin Project, Talent Division, OR

Dear Mr. Griffin,

The Bureau of Reclamation (Reclamation) is proposing to enter into Section 7 consultation regarding the operation and maintenance of irrigation facilities within Reclamation's Rogue River Basin Project, Talent Division. The facilities included in this consultation are operated and maintained by the Talent, Medford and Rogue River Valley irrigation districts. Irrigated lands served by these districts are located in and around the Medford area and total about 35,000 acres. There are an extensive network of reservoirs, canals, and diversion facilities utilized to bring water to the districts' irrigated crop lands.

Many of the facilities currently used by the Talent, Medford, and Rogue River Valley districts were originally constructed in the early 1900's by private parties. The Federal government became involved in the 1950's and 60's when Congress authorized Reclamation to conduct rehabilitation, enlargement, and extension of the existing water diversion and delivery facilities. A general description of the three districts, including facilities discussion, development history, and project benefits, is attached. A facilities location map is include for your information.

Operation of the three irrigation districts along with a large component of non Federal irrigation in the Rogue River basin affects, stream flow conditions. These effects will be described in a biological assessment using the best information available and to the extent possible. Project lands and water conveyance facilities are spread over an expansive area of the Little Butte Creek and Bear Creek drainages (Rogue basin). Some project reservoir storage and transbasin

diversion facilities are also located on the east side of the Cascade divide and impact stream flows in Fourmile Creek and Jenny Creek (Klamath River basin).

We are requesting that your office provide a listing of ESA anadromous fish species found in the Rogue River basin. Regarding the Klamath River basin, we are sending a similar request to the National Marine Fisheries Service field office in Arcata, California. We anticipate the list of species to include:

Southern Oregon/Northern California Coasts coho ESU (threatened)
Klamath Mountains Province steelhead ESA (candidate)

We would appreciate receiving your confirmation or adjustments to this list at your earliest possible convenience. Please send your response and any other correspondence related to this request to me at the above address with a copy to: Bureau of Reclamation, Attention: PN 6540, 1150 North Curtis Road, Suite 100, Boise ID, 83706-1234. If you have any questions during the course of this review, please contact Mr. Richard Prange at (208) 378-5031.

Sincerely,

J. Eric Glover
Area Manager

Enclosures - 2

bc: PN-6540, BFO-6100 (all wo/encls)

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

IN REPLY REFER TO:

PN-6540
ENV-7.00

AUG 23 2000

Ms. Rebecca Lent
Regional Administrator
National Marine Fisheries Service, Southwest Region
501 West Ocean Blvd.
Long Beach, CA 90802- 4213

Subject: Request for List of Threatened and Endangered Species - Endangered Species Act, Section 7 - Bureau of Reclamation's Rogue River Basin Project, Talent Division, OR

Dear Ms. Lent,

The Bureau of Reclamation (Reclamation) is proposing to enter into Section 7 consultation regarding the operation and maintenance of irrigation facilities within Reclamation's Rogue River Basin Project, Talent Division. The facilities included in this consultation are operated and maintained by the Talent, Medford and Rogue River Valley irrigation districts. Irrigated lands served by these districts are located in and around the Medford area and total about 35,000 acres. There are an extensive network of reservoirs, canals, and diversion facilities utilized to bring water to the districts' irrigated crop lands.

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Operation of the three irrigation districts along with a large component of non Federal irrigation in the Rogue River basin affects, stream flow conditions. These effects will be described in a biological assessment using the best information available and to the extent possible. Project lands and water conveyance facilities are spread over an expansive area of the Little Butte Creek and Bear Creek drainages (Rogue basin). Some project reservoir storage and transbasin diversion facilities are also located on the east side of the Cascade divide and impact stream flows in Fourmile Creek and Jenny Creek (Klamath River basin).

We are requesting that your office provide a listing of ESA anadromous fish species found in the Klamath River basin. Regarding the Rogue River basin, we are sending a similar request to the National Marine Fisheries Service office in Portland. We anticipate the list of species to include:

Southern Oregon/Northern California Coasts coho ESU (threatened)
Klamath Mountains Province steelhead ESA (candidate)

We would appreciate receiving your confirmation or adjustments to this list at your earliest possible convenience. Please send your response and any other correspondence related to this request to me at the above address with a copy to: Bureau of Reclamation, Attention: PN 6540, 1150 North Curtis Road, Suite 100, Boise ID, 83706-1234. If you have any questions during the course of this review, please contact Mr. Richard Prange at (208) 378-5031.

Sincerely,

J. Eric Glover
Area Manager

Enclosures - 2

cc: Lrma Lagomarsino
National Marine Fisheries Service
1655 Heindoon Rd.
Arcata, CA 95521
(w/encls)

bc: PN-6540, BPO-6100 (all wo/encls)
Mark Buettner, Klamath Falls Area Office (w/encls)

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KRP

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Region
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802
(562) 980-4000; Fax (562) 980-4018

BUREAU OF

ORDER NO. 4627

September 12, 2000

6540 KP 9/20

J. Eric Glover ORDER NO. 18258
Bureau of Reclamation
Lower Columbia Area Office
825 NE Multnomah Street, Suite 1110
Portland, Oregon 97232-2135

Dear Mr. Glover:

Thank you for your letter of August 28, 2000 regarding the presence of Federally listed (or proposed/candidate for listing) threatened or endangered species in the Klamath River basin, and critical habitat in the Klamath River basin that may be affected by the Bureau of Reclamation's Rogue River Basin Project.

Available information indicates that the following species may occur downstream of Irongate Dam on the Klamath River, which is downstream of the project area:

Southern Oregon/Northern California ESU coho salmon (*Oncorhynchus kisutch*) - threatened

Klamath Mountains Province ESU steelhead (*Oncorhynchus mykiss*) - candidate

Critical habitat for the Southern Oregon/Northern California ESU coho salmon extends on the Klamath River as far upstream as the Irongate Dam.

The U.S. Fish and Wildlife Service (USFWS) may also have listed species or critical habitat under its jurisdiction in the project area. Please contact Mr. Greg Goldsmith, 1655 Heindon Road, Arcata, CA, 95521, or (707) 825-5120, regarding the presence of listed species or critical habitat under USFWS jurisdiction that may be affected by your project.

If you have questions concerning these comments, please contact Mr. Mike Kelly at (707) 825-5178.

Sincerely,

for Dina Lagomarsino

Rebecca Lent, Ph.D.
Regional Administrator

cc: ✓ Bureau of Reclamation
Attention: PN 6540
1150 North Curtis Road, Suite 100
Boise, Idaho 83706-1234

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Klamath Falls Fish & Wildlife Office
6610 Washburn Way
Klamath Falls, OR 97603
(541)885-8481 FAX: (541)885-7837

SEP 25 2000

1000 sd 9/27
6100 copy faxed
9/25/00

September 22, 2000

Memorandum

In reply refer to 1-10-00-SP-165

To: J. Eric Glover, Bureau of Reclamation, 825 NE Multnomah Street, Suite 1110, Portland, Oregon 97232-2135

From: Field Supervisor, Klamath Falls Fish and Wildlife Office, Klamath Falls, Oregon

Subject: Species List for Klamath County, Oregon

This letter responds to your request for information on listed and proposed endangered and threatened species that may occur in the vicinity of the Bureau of Reclamation's Rogue River Basin Project.

The Klamath River Basin portion of the proposed project area falls within the jurisdiction of the Klamath Falls Fish and Wildlife Office and the Rogue River Basin portion falls within the jurisdiction of the Oregon State Office. Therefore, coordination needs to continue between our offices for your consultation needs under section 7 of the Endangered Species Act (Act) and we can also assist in other issues relating to our trust resources.

We have enclosed a species list for Klamath County, Oregon, and the list fulfills the requirements of the Service under section 7(c) of the Act. A similar letter from the Oregon State Office will cover the Rogue River Basin area of the proposed project area. If the subject project may affect a listed species and the proposed action is funded, permitted, or implemented by a Federal agency, the Federal agency must prepare a biological assessment if the project is a construction project which may require an environmental impact statement [1]. If a biological assessment is not required, the Federal agency still has the responsibility to review its proposed activities and determine whether the listed species may be affected.

During the assessment or review process, the Federal agency may engage in planning efforts, but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act. If a listed species may be affected, the Federal agency should request, in writing through our offices, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

The Bureau of Reclamation should be aware that section 9 of the Act prohibits the "take" of any listed species. The definition of "take" includes to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. "Harm" in the definition of 'take' in the Act means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3)." Anyone who engages in a take would be subject to prosecution under section 9 of the Act. Such taking may occur only under the authority of the Service pursuant to section 7 (if a Federal agency is involved with this project) or through a section 10(a)(1)(B) permit, as mandated in the Act.

If you have any questions, please contact Leonard LeCaptain of my staff at (541) 885-8481 (Klamath Basin), Scott Center of the Roseburg Fish and Wildlife Office at (541) 957-3472 (Rogue Basin), or Cindy Bright of the Oregon State Office at (503) 231-6179 (Rogue Basin).

Sincerely,

Steven Alan Lewis
Field Supervisor

cc: USFWS-CNO, Attn: John Engbring
USFWS-Roseburg, Attn: Scott Center
USFWS-Portland, Attn: Cindy Bright
ODFW-Klamath Falls, Attn: Roger Smith and Ron Anglin
Klamath Tribes, Attn: Rick Ward

[1] "Construction Project" means any major Federal action which significantly affects the quality of the human environment designed primarily to result in the building or erection of man-made structures such as dams, buildings, roads, pipelines, channels and the like. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approval which may result in construction. In October of last year you received a list of Federally threatened, endangered and proposed species that may be present in Crater Lake National Park. That list was valid for 90 days or until we sent a memorandum with any changes that occurred. This memorandum is to inform you that no changes have occurred since you received the last list. Attached you will find another copy of the list with a current compilation date that reflects this change. In April you will receive another memorandum updating the existing species list.

Attachments

LISTED, PROPOSED AND CANDIDATE SPECIES THAT MAY OCCUR IN KLAMATH COUNTY, OREGON

LISTED SPECIES

Mammals

Canada lynx, *Lynx canadensis* (T)

Birds

Bald eagle, *Haliaeetus leucocephalus (T)*

Northern spotted owl, *Strix occidentalis caurina (T)* (CH)

Fish

Shortnose sucker, *Chasmistes brevirostris* (E) (PCH)

Lost River sucker, *Deltistes luxatus (E)* (PCH)

Bull trout, *Salvelinus confluentus* (T)

Plants

Applegate's milk vetch, *Astragalus applegatei (E)*

PROPOSED SPECIES

None

CANDIDATE SPECIES

Amphibians

Oregon spotted frog, *Rana pretiosa* (C)

Key to Federal Threatened and Endangered Species and Species of Concern Lists

(E)--Endangered, (T)--Threatened (P)--Proposed (C)--Candidate,
(CH)--Critical Habitat (PCH)--Proposed Critical Habitat (PT)--Proposed Threatened
(PE)--Proposed Endangered

updated September 2000

4844

18274

ENV 7.00

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Oregon State Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

OFFICIAL FILE COPY
OCT 02 '00

TO	INIT	DATE
1000		
1050		
1070	UL	10/2
3000		

Reply To: 8330.6341(00)
File Name: Sp634.wpd

September 28, 2000

CY 6500
6540

J. Eric Glover
U.S. Bureau of Reclamation
825 NE Multnomah Street, Suite 1110
Portland, OR 97232-2135

Subject: Rogue River Basin Project (1-7-00-SP-634).

Dear Mr. Glover:

This is in response to your memorandum, dated August 23, 2000, requesting information on listed and proposed endangered and threatened species that may be present within the area of the Rogue River Basin Project in Jackson and Klamath Counties. A separate list will be sent from the Klamath Falls Fish and Wildlife office in response to the Klamath county area of the project. The U.S. Fish and Wildlife Service (Service) received your letter on August 24, 2000.

We have attached a list (Attachment A) of threatened and endangered species that may occur within the area of the Rogue River Basin Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). U.S. Bureau of Reclamation (BR) requirements under the Act are outlined in Attachment B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, BR is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in NEPA (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Attachment B, as well as 50 CFR 401.12.

If BR determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, BR is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

Attachment A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published October 25, 1999, in the Federal Register (Vol. 64, No. 205, 57534) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect candidate species or species of concern, BR is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends addressing potential impacts to these species in order to prevent future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, BR may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages BR to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Scott Center at (541) 957-3472, or Cindy Bright at (503) 231-6179. For questions regarding anadromous fish, please contact National Marine Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400. All correspondence should include the above referenced file number.

Sincerely,

for Kemper M. McMaster
State Supervisor

Attachments
SP 634
cc: OSO-ES
ODFW (nongame)
cc: Bureau of Reclamation ✓
Pacific North West Region
cc: Leonard LeCaptain
Klamath Falls
cc: Scott Center FWS
Roseburg

ATTACHMENT A

FEDERALLY LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES, CANDIDATE SPECIES AND SPECIES OF CONCERN THAT MAY OCCUR WITHIN THE AREA OF THE ROGUE RIVER BASIN PROJECT AREA
1-7-00-SP-634

LISTED SPECIES[1/]

Birds		
Bald eagle	*Haliaeetus leucocephalus*	T
Northern spotted owl[2/]	*Strix occidentalis caurina*	CH T
Fish		
Coho salmon (S. Oregon/N. Calif. Coast)[3/]	*Oncorhynchus kisutch*	**T
Invertebrates		
Vernal pool fairy shrimp	*Branchinecta lynchi*	T
Plants		
Gentner mission-bells[4/]	*Fritillaria gentneri*	E

PROPOSED SPECIES

Plants		
Large-flowered wooly meadowfoam[5/]	*Limnanthes floccosa* ssp. *grandiflora*	PE
Cook's lomatium[5/]	*Lomatium cookii*	PE

CANDIDATE SPECIES

Fish		
Steelhead (Klamath Mountains Province)[6/]	*Oncorhynchus mykiss*	**CF
Amphibians and Reptiles		
Oregon spotted frog[7/]	*Rana pretiosa*	

SPECIES OF CONCERN

Mammals	
White-footed vole	*Arborimus albipes*
Pacific western big-eared bat	*Corynorhinus (=Plecotus) townsendii townsendii*
California wolverine	*Gulo gulo luteus*
Pacific fisher	*Martes pennanti pacifica*
Long-eared myotis (bat)	*Myotis evotis*
Fringed myotis (bat)	*Myotis thysanodes*
Long-legged myotis (bat)	*Myotis volans*
Yuma myotis (bat)	*Myotis yumanensis*
Birds	
Northern goshawk	*Accipiter gentilis*
Tricolored blackbird	*Agelaius tricolor*
Olive-sided flycatcher	*Contopus cooperi (=borealis)*
Little willow flycatcher	*Empidonax traillii brewsteri*

Western least bittern	*Ixobrychus exilis hesperis*
Amphibians and Reptiles	
Tailed frog	*Ascaphus truei*
Northwestern pond turtle	*Clemmys marmorata marmorata*
Siskiyou Mountains salamander	*Plethodon stormi*
Northern red-legged frog	*Rana aurora aurora*
Foothill yellow-legged frog	*Rana boylii*
Cascades frog	*Rana cascadae*
Fish	
Jenny Creek sucker	*Catostomus rimiculus* ssp.
Pacific lamprey	*Lampetra tridentata*
Southern OR/CA Coastal cutthroat trout	*Oncorhynchus clarki clarki*
Invertebrates	
Denning's agapetus caddisfly	*Agapetus denningi*
Franklin's bumblebee	*Bombus franklini*
Siskiyou chloealtis grasshopper	*Chloealtis aspasma*
Green Springs Mountain farulan caddisfly	*Farula davisi*
Sagehen Creek goeracean caddisfly	*Goeracea oregona*
Schuh's homoplectran caddisfly	*Homoplectra schuhi*
Siskiyou gazelle beetle	*Nebria gebleri siskiyouensis*
Mardon skipper butterfly	*Polites mardon*
Siskiyou caddisfly	*Tinodes siskiyou*
Plants	
Henderson's bentgrass	*Agrostis hendersonii*
Crenulate grape-fern	*Botrychium crenulatum*
Broad-leaf mariposa-lily	*Calochortus nitidus*
Greene's mariposa-lily	*Calochortus greenei*
Tall bugbane	*Cimicifuga elata*
Mount Mazama collomia	*Collomia mazama*
Clustered lady's-slipper	*Cypripedium fasciculatum*
Umpqua green-gentian	*Frasera umpquaensis*
Bellinger's meadowfoam	*Limnanthes floccosa* ssp. *bellingeriana*
Slender meadow-foam	*Limnanthes gracilis* ssp. *gracilis*
White meconella	*Meconella oregana*
Detling's microseris	*Microseris laciniata* ssp. *detlingii*
Pygmy monkeyflower	*Mimulus pygmaeus*
Coral seeded allocarya	*Plagiobothrys figuratus* ssp. *corallicarpus*
Southern Oregon buttercup	*Ranunculus austro-oreganus*
Columbia cress	*Rorippa columbiae*
Applegate stonecrop	*Sedum oblanceolatum*

(E) - Listed Endangered *(T) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

(CF) - Candidate: National Marine Fisheries Service designation for any species being considered by the Secretary for listing for endangered or threatened species, but not yet the subject of a proposed rule.

** *Consultation with National Marine Fisheries Service required.*

[1] *U. S. Department of Interior, Fish and Wildlife Service, December 31, 1999, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12.*

[2] *Federal Register Vol. 57, No. 10, January 15, 1992, Final Rule-Critical Habitat for the Northern Spotted Owl*

[3] *Federal Register Vol. 62, No. 87, May 6, 1997, Final Rule-Coho salmon*

[4] *Federal Register Vol. 64, No. 237, December 10 , 1999, Final Rule -Fritillaria gentneri*

[5] *Federal Register Vol. 65, No.94, May 25, 2000, Proposed Rule - Lomatium cookii and Limnanthes floccosa ssp. grandiflora*

[6] *Federal Register Vol. 63, No. 53, March 19, 1998, Final Rule-West Coast Steelhead*

[7] *Federal Register Vol. 62, No. 182, September 19, 1997, Notice of Review-Candidate or Proposed Animals and Plants*

ATTACHMENT B

FEDERAL AGENCIES RESPONSIBILITIES UNDER SECTION 7(a) and (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a)-Consultation/Conference

Requires:

1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;

2) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of Critical Habitat. The process is initiated by the Federal agency after they have determined if their action may affect (adversely or beneficially) a listed species; and

3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed Critical Habitat.

SECTION 7(c)-Biological Assessment for Major Construction Projects[1]

Requires Federal agencies or their designees to prepare a Biological Assessment (BA) for construction projects only. The purpose of the BA is to identify proposed and/or listed species which are/is likely to be affected by a construction project. The process is initiated by a Federal agency in requesting a list of proposed and listed threatened and endangered species (list attached). The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

To complete the BA, your agency or its designee should: (1) conduct and on-site inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species is present and whether suitable habitat exists for either expanding the existing population or for potential reintroduction of the species; (2) review literature and scientific data to determine species distribution, habitat needs, and other biological requirements; (3) interview experts including those within FWS, National Marine Fisheries Service, State conservation departments, universities, and others who may have data not yet published in scientific literature; (4) review and analyze the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; (5) analyze alternative actions that may provide conservation measures and (6) prepare a report documenting the results, including a discussion of study methods used, nay problems encountered, and other relevant information. The BA should conclude whether or not a listed species will be affected. Upon completion, the report should be forwarded to our Portland Office.

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[1]A construction project (or other undertaking having similar physical impacts) which is a major Federal action significantly affecting the quality of the human environment as referred to in NEPA (42 U.S.C. 4332. (2)c). On projects other that construction, it is suggested that a biological evaluation similar to the biological assessment be undertaken to conserve species influenced by the Endangered Species Act.

— APPENDIX B—

Hydrology

Little Butte and Bear Creek Surface Water Distribution Model
DRAFT - Model Version March 26, 2003

by Leslie Stillwater
April 9, 2003

INTRODUCTION

This document describes the computer model[1] developed to simulate the surface waters, return flows, natural flow rights and storage accounting of Little Butte and Bear Creeks which are tributaries to the Rogue River.

Background

The model was developed for the Little Butte / Bear Creeks Management Project Steering Committee (formerly, IPOD) to demonstrate the effects of saved water and alternative and supplemental water supplies. The irrigation districts and other local irrigators, the State water master, and technical specialists from Federal and State natural resource agencies, provided direction and input for model development.

The model consists of a network representing the physical and operational characteristics of Little Butte and Bear Creeks. Simulations are performed by applying the historic monthly water supply from water years 1962 through 1999 to the model network.

The physical scope of the model covers the transbasin diversions from the Klamath Basin at Fourmile and Jenny Creeks; Fourmile, Fish Lake, Hyatt, Howard Prairie, Emigrant and Agate Reservoirs; diversions from Emigrant and Bear Creeks downstream to just past the Jackson Creek below Central Point; and diversions from North and South Fork Little Butte Creeks to just past their confluence. This coverage includes all of the Rogue River Basin Project (Talent Division) impacts to the Rogue River Basin.

Viewing Model Output

An enormous quantity of data is generated for each model run. To simplify analysis, selected model output can be viewed using the data access tool Pisces[2].

MODEL BASICS

Modeled Delivery Requests

In the model, irrigated lands request water based upon the following parameters:

- the number of acres irrigated,
- irrigation requirement (acre-feet/acre),
- water supply year type (dry, average or wet), and
- on-farm efficiencies.

Modeled Diversions

[1] Modsim , a general-purpose river and reservoir operations simulation model, was used. Modsim was developed at Colorado Statue University in the 1970's and since 1992 under joint agreement with the U.S. Bureau of Reclamation Pacific Northwest Region (PNRO).

[2] Pisces was developed by PNRO for viewing and formatting data from a variety of databases, including Modsim output, Hydromet and USGS archives. Pisces is currently available on CD or via email by request and can also be made available through the web.

Modeled requests for deliveries can be met by diversion into the major canals, taking into consideration the following parameters:

- distribution efficiencies (canal losses),
- natural flow rights in priority (if applicable), and
- project water in Emigrant, Hyatt and Howard Prairie Reservoirs (if water is available in the spaceholder's account) and stored water in Fish Lake and Fourmile Reservoir.

Delivery requests can also be met by return flows and runoff from neighboring lands, if available in the alternative.

Modeled Irrigation Shortages

The model determines irrigation shortage at each major canal. Irrigation shortage is the deficiency at the point of diversion, either from Bear Creek or from the Medford and Hopkins Canals.

MODEL PARAMETERS

Number of Acres Irrigated

The lands modeled are based on preliminary estimates of the Proof Survey and are listed in Table 1.

Lands, which are not listed in the table, but are currently either diverting flows or benefiting from return flows and runoff, are not explicitly modeled. The behavior and impacts of these lands are implicitly modeled in the gains and losses to each reach which are calculated from observed (historic) flows.

Irrigation Requirement

Irrigation Requirement is the crop evapotranspiration minus the effective precipitation. See table Bear Creek Basin-Irrigation Water Requirements.

Diversion Requirement

The modeled diversion requirement is the quantity of water needed at the point of the diversion to satisfy the irrigation requirement. The diversion requirement is determined by dividing the irrigation requirement by the on-farm and distribution efficiencies (discussed in the sections that follow). The diversion requirements are shown in Table 2. When diversion requirements can not be met by the model, shortages occur.

Water Supply Year Type

Water supply year type, as defined in the model, is an attempt to acknowledge that irrigators and reservoir operators make decisions based not only on forecasted inflows, but also on the current state of the reservoirs. Historic WY1962 through WY1999 monthly inflows to Emigrant, Howard Prairie and Hyatt Reservoir plus the observed end-of-month contents of the reservoirs were summed and sorted. An average water supply for each month was then defined as falling within the 40% to 60% exceedance range. Dry through wet water year types were determined accordingly.

Water supply year type affects delivery requests in the model.

Table 1. Modeled Number of Acres Irrigated

Irrigation District	*Point of Diversion*	*Acres Irrigated*	*Comments*
Talent ID			
	Ashland Lateral	1940	1640 TID; 300 Ashland Ditch Co.
	East Lateral	10700	1810 eastside; 8890 westside
	Talent Lateral (Oak Street Diversion Dam)	4020	eastside
Medford ID[3]			
	Phoenix Canal and Medford Canal	6770	westside
	Medford Canal	4164	above siphon at Bear Crk
Rogue River Valley ID			
	Westside	3600	served by the Bear Crk Canal (Jackson Street Diversion Dam) and the Hopkins Canal
	Eastside	5280	served by the Hopkins Canal
	'1000 acres'	1000	above Agate Reservoir on the Hopkins Canal
	'40 acres'	40	served by the Medford Canal

Table 2. Modeled Diversion Requirements (acre-feet / acre)

District->	Rogue River Valley and Medford			Talent		
Year Type->	**Average**	**Wet**	**Dry**	**Average**	**Wet**	**Dry**
April	.37	.41	.32	.16	.19	.27
May	.57	.64	.50	.56	.54	.48
June	.78	.88	.69	.71	.66	.50
July	1.11	1.25	.98	.74	.87	.66
August	.91	1.02	.80	.69	.84	.62
September	.57	.64	.50	.45	.62	.31
October	.16	.18	.14	.01	.01	.06
sum	**4.47**	**5.02**	**3.93**	**3.32**	**3.73**	**2.90**

Distribution Efficiencies

[3] Preliminary Proof Survey values for irrigated lands on Medford ID were used. Final Proof Survey values may be greater but the increase would have only negligible impacts to study results.

Distribution efficiency is the water delivered divided by the water diverted at the main canal (either from Bear Creek or the Hopkins and Medford Canals). Current distribution efficiencies were determined from delivery and diversion data.

Current distribution efficiencies for Talent Irrigation District, without considering spills from the Ashland Lateral, are from 75% to 79%.

Ashland Lateral spills to Emigrant Reservoir at Cooke siphon are estimated as 42% of the diversion in May; 35% in June; 22% in July; 9% in August; and 11% in September.

Current distribution efficiencies for Medford and Rogue River Valley Irrigation Districts are estimated as 83%.

Distribution *in*efficiencies and losses are shown in Table 3. Sources for the data and calculations can be found in footnotes on the same page.

On-Farm Water Use Efficiencies

On-farm water use efficiency is defined as the irrigation requirement divided by the farm delivery. Estimated on-farm efficiencies for lands served by the Talent Lateral were calculated from the irrigation requirements (see Appendix A), the reported diversions, and estimated distribution efficiencies. Talent Lateral on-farm efficiencies range from 75% to 98%. Similar efficiencies were applied to all Talent Irrigation District lands. On-farm efficiencies for Talent lands, calculated in this manner, are likely high due to intercepted runoff. However, Talent diversions and lands are the uppermost in the system and the intercepted runoff did not originate as return flows and excess from neighboring lands. This means that Talent's diversion requests in the model appropriately reflect the availability of intercepted flows.

On-farm water use efficiencies for Medford and Rogue River Valley Irrigation Districts are assumed to be about 66% under current conditions. This value does not include intercepted return flows, and allows for the investigation of the effects of the loss of intercepted return flows in alternatives which tighten irrigation and delivery efficiencies upstream.

Losses from the Howard Prairie Delivery Canal

Modeled losses from the Howard Prairie Delivery Canal are based on WY2002 measured flows. Estimated losses are 8% in October; 5% in May; 8% in June; and 12% in July. In November through February, the canal gains flow and in March through April losses are less than 3%. The losses also reflect intercepted local flows.

Natural Flow Rights

In the model, natural flow can be diverted in priority to meet delivery requests. Natural flow is measured at the point of diversion in the major canals, so if distribution loss occurs in the canal, a portion of the natural flow delivery is lost but still contributes to the flow delivery rate calculation.

Storage rights are used to fill reservoirs. These storage rights compete in priority with natural flow rights for diversion.

Table 4 shows the natural flow rights modeled.

Table 3. Modeled Distribution Losses		
Location	***Spill or Loss***	***Comments***
Ashland Lateral - from point of diversion to Cooke Siphon	9% to 42% of diversion	spilled back into Emigrant Reservoir; percentages vary by time of year; based on 1994-2001 measured flows
Ashland Lateral - from Cooke Siphon to Farm	20-25% of remaining diversion (after spill at Cooke Siphon)	estimated[4].
East Lateral	20-25% of diversion	estimated[5]
Talent Lateral	20-25% of diversion	estimated
Phoenix	17% of diversion	estimated[6]
Bear Crk Canal (Jackson Street Diversion)	17% of diversion	estimated[7]
Joint System Canal above Bradshaw Drop	about 25% of diversion	based on observed loss between gaging stations; may be due to undocumented irrigation; not recovered.
Hopkins Canal	25.5% of flow diverted into the Hopkins Canal at Bradshaw Drop	estimated[8]; not recovered
Medford Canal	17% of flow diverted into the Medford Canal at Bradshaw Drop	estimated
Howard Prairie Delivery Canal below Howard Prairie	8-12%	varies by month, based on WY2001 measured flows; not recovered
Cascade Canal	33%	based on observed loss between gaging stations; not recovered

Reservoir Storage and Accounting

[4] A comparison of values in: the Talent Irrigation District Water Management/Conservation Plan (Conservation Plan), Talent Irrigation District and H&R Engineering, October, 1998 and The Bear Creek/Little Butte Creek Water Management Study Appraisal Report and Appendix, U.S. Bureau of Reclamation, February 2001 (Appraisal Report).
[5] estimated delivery efficiency values for the major canals are reported in TID's Water Conservation Plan.
[6] Medford Irrigation District Water Conservation Plan, 1995.
[7] Rogue River Valley Irrigation District Water Management/Conservation Plan, Rogue River Valley Irrigation District and H&R Engineering, October, 1998.
[8] Appraisal Report.

After delivery requests have exhausted their available natural flow in priority and private stored water in Fourmile Reservoir and Fish Lake, they rely on the delivery of project stored water, if water is available in their storage account. Stored water is measured at the point of diversion, so just like natural flow, if distribution loss occurs, that loss is charged to the user's storage account.

When water is diverted, it is debited from the user's storage account. Carryover from year to year is allowed, but users may have to share in operational losses and evaporation. Users also benefit if a reservoir is allowed to backfill.

Table 5 shows the storage accounts maintained in the model.

Other Parameters

Limitations on trans-basin diversions. In the model, flow through the Cascade Canal, and the Deadwood and Dead Indian diversions is limited to the historic observed flows. This means that the model is not managing those diversions. This approach is appropriate because many factors which can not be modeled, including accessibility, determine the rate and timing of diverted flows.

Table 4. Modeled Natural Flow Rights

	Priority Date	*Rate/ Capacity*	*Owner*	*Allowed diversion dates*	*Comments*
Little Butte Creek					
North Fork	1909	125 cfs	MID, RRVID	1Apr - 31Oct	
South Fork	1909	100 cfs	MID, RRVID	1Apr - 31Oct	
Bradshaw Drop		140 cfs	MID, RRVID		source: Osborn Crk and others; not modeled due to lack of adequate water supply data
Little Butte Creek below confluence	~1800	24 cfs	others	1Apr - 31Oct	satisfies all the senior water rights on Little Butte Creek; MID and RRVID 'exchange' storage water for this flow
Bear Creek					
	1Mar 1915	60 cfs	MID		Phoenix capacity = 60 cfs
	24Jun 1913	40 cfs	RRVID		Jackson St Diversion capacity = 40 cfs
	31Jul 1915	28 cfs	TID		Ashland Crk; Neil Crk
	~1860 - 1888	un-known			not explicitly modeled; no data are available to determine current diversion rates; likely satisfied by return flows; implicitly described in the modeled water supply, but in alternatives with no return flows these rights may not be adequately modeled
Storage Rights					
Fish Lake	1910			15Oct - 1Apr+	allowed to backfill
Emigrant	6Sep 1915	36658 AF	USBR		This includes Hyatt stored water as well as natural flow.
Emigrant	27Jan 1920	40 cfs; 2342 AF	TID		Modeled as additional capacity to the 6Sep1915 USBR right to fill Emigrant because it is included in the 7.39% preferred capacity in the contract
Fourmile	31Mar 1910	15800 AF	MID, RRVID		
Howard Prairie	6Sep 1915	60600 AF	USBR	1Nov-31May	
South Fork Little Butte Creek	23May 1912	60 cfs	TID	year round	contributes to Howard Prairie
Hyatt	31Jul 1915	16200 AF, 136 cfs	TID	1Nov-31May	Keene Crk water right; 100 cfs of the 136 is also Green Spring Power Plant's right; that 100 cfs is natural flow for Ashland Lateral, but is allowed to be stored and delivered at a later date

Table 5. Modeled Storage Accounts

	share	capacity (acre-feet)	Comments
Howard Prairie, Hyatt and Emigrant combined		**115,800**	
Talent ID preferred	7.3913 %	8,559	provided 'first fill'
Medford ID	7.5117 %	8,698	
Rogue River Valley ID	3.7559 %	4,349	
Talent ID	81.3411 %	94,193	
Fish Lake and Fourmile combined		**23,450**	
Medford ID	66 %	15,633	
Rogue River Valley ID	33 %	7,817	
Agate Reservoir		4,700	
Rogue River Valley ID	100%	4,700	filled by Dry Creek; also re-regulates Fourmile and Fish Lake flows

CALIBRATION AND PROPOSED ACTION ALTERNATIVES

Calibration

The model has been calibrated to the available data for observed streamflows, diversions, and reservoir contents. Where data were not available, an attempt was made to estimate the data through correlations with other sources. Model calibration can be checked by comparing historic observed flows and reservoir contents with the Proposed Action flows and contents (Pisces can be used for this check).

Proposed Action Alternative

The Proposed Action Alternative represents the current physical and operational parameters of the Little Butte Creek / Bear Creek system. Modeled Proposed Action reservoir contents, streamflows, diversions and shortages may differ from historic and present day system states because:

- Land use has changed over the past 40 years and changes year to year depending on the perceived water supply. In the model, the number of acres requesting water does not change from year to year (see Tables 1 and 2 above.).

- Although the model enforces a strict interpretation of priority on water rights, that standard can never be practiced in the field. In practice, reservoirs may fill beyond their right when inflows are available, and the distinction between natural flow and stored water is less precise. Water may be diverted in the field beyond or without a right, when there is limited reporting on system inflows.

- The model reflects Reclamation's interpretation of project contracts.

- Inflows, diversions, losses and gains occur which are not or can not be quantified. If a process is not quantified, it is handled in the model implicitly and may not be apparent to the modeler or the client. The assumption that these implicit processes will not impact or are not impacted by the modeled alternatives may not be true in the field.

- Parameters in Tables 1 through 5 apply.

Bear Creek Basin - Irrigation Water Requirements											
Crop Evapotranspiration - ET, (Ave year - 5 of 10 year) - Medford Area 1											
Talent Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											
Fruit - Apples,Pears,Cherries		4330.0	26.55	3.37	5.38	7.11	8.84	7.34	5.15	2.47	39.66
Alfalfa Hay		400.0	2.45	3.35	4.69	5.63	6.85	5.75	4.21	2.80	33.28
Grass Pasture		7080.0	43.41	3.58	5.04	6.02	7.32	6.06	4.45	2.83	35.30
Other hay - grass/alfalfa		4350.0	26.67	3.46	4.86	5.82	7.08	5.90	4.35	2.80	34.27
Misc		150.0	0.92	2.42	4.25	5.75	7.65	5.55	3.3	1.6	30.52
Total acres		16310.0	100.00								
Total weighted ET - ac-in/ac				3.48	5.07	6.24	7.65	6.34	4.59	2.71	36.08
Total weighted ET - ac-ft/ac				0.29	0.42	0.52	0.64	0.53	0.38	0.23	3.01
Total AF				4730	6891	8481	10398	8617	6239	3683	49039
Medford Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											
Fruit - Apples,Pears,Cherries		1274.0	10.18	3.37	5.38	7.11	8.84	7.34	5.15	2.47	39.66
Alfalfa Hay		570.0	4.55	3.35	4.69	5.63	6.85	5.75	4.21	2.80	33.28
Grains		240.0	1.92	2.66	5.44	6.83	6.28	0.50	0.00	0.00	21.71
Vegetables/turf/etc.		637.0	5.09	3.20	3.75	5.25	7.60	6.20	4.60	2.00	32.60
Grass Pasture		9144.0	73.04	3.58	5.04	6.02	7.32	6.06	4.45	2.83	35.30
Seed		451.0	3.60	1.90	3.00	4.70	7.40	6.90	5.00	3.00	31.90
Misc		203.0	1.62	2.42	4.25	5.75	7.65	5.55	3.3	1.6	30.52
Total acres		12519.0	100.00								
Total weighted ET - ac-in/ac				3.43	4.92	6.04	7.45	6.10	4.43	2.68	35.05
Total weighted ET - ac-ft/ac				0.29	0.41	0.50	0.62	0.51	0.37	0.22	2.92
Total AF				3580	5127	6300	7778	6362	4625	2798	36570
Rogue River Valley Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											

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Fruit - Apples,Pears,Cherries		882.0	10.18	3.37	5.38	7.11	8.84	7.34	5.15	2.47	39.66
Alfalfa Hay		394.0	4.55	3.35	4.69	5.63	6.85	5.75	4.21	2.80	33.28
Grains		166.0	1.92	2.66	5.44	6.83	6.28	0.50	0.00	0.00	21.71
Vegetables/turf/etc.		440.0	5.08	3.20	3.75	5.25	7.60	6.20	4.60	2.00	32.60
Grass Pasture		6327.0	73.04	3.58	5.04	6.02	7.32	6.06	4.45	2.83	35.30
Seed		312.0	3.60	1.90	3.00	4.70	7.40	6.90	5.00	3.00	31.90
Misc		141.0	1.63	2.42	4.25	5.75	7.65	5.55	3.3	1.6	30.52
Total Acres		8662.0	100.00								
Total weighted ET - ac-in/ac				3.43	4.91	6.04	7.46	6.10	4.43	2.68	35.05
Total weighted ET - ac-ft/ac				0.29	0.41	0.50	0.62	0.51	0.37	0.22	2.92
Total AF				2477	3547	4358	5382	4402	3200	1935	25301
1/ From: Oregon Crop Water Use & Irrigation Requirements, OSU Extension Misc 8530, March 1999											
Crop Irrigation Requirement - IR, (Ave year - 5 of 10 year) - Medford Area 1											
Talent Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											
Fruit - Apples,Pears,Cherries		4330.0	26.55	2.12	4.10	6.20	8.65	7.20	4.38	0.95	33.60
Alfalfa Hay		400.0	2.45	2.05	3.50	4.84	6.73	5.59	3.46	0.00	26.17
Grass Pasture		7080.0	43.41	2.58	3.78	5.16	7.20	5.91	3.74	1.22	29.59
Other hay - grass/alfalfa		4350.0	26.67	2.30	3.60	5.00	6.95	5.75	3.60	1.22	28.42
Misc		149.0	0.91	2.00	4.50	5.40	6.60	5.20	3.80	1.40	28.90
Total acres		16309.0	100.00								
Total weighted IR - ac-in/ac				2.35	3.80	5.37	7.52	6.19	3.86	1.02	30.11
Total weighted IR - ac-ft/ac				0.20	0.32	0.45	0.63	0.52	0.32	0.08	2.52
Total AF				3262	5219	7304	10204	8415	5243	1384	41031
Medford Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											
Fruit - Apples,Pears,Cherries		1274.0	10.18	2.12	4.10	6.20	8.65	7.20	4.38	0.95	33.60
Alfalfa Hay		570.0	4.55	2.05	3.50	4.84	6.73	5.59	3.46	0.00	26.17
Grains		240.0	1.92	1.70	4.08	5.04	6.50	0.65	0.00	0.00	17.97

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Vegetables/turf/etc.		637.0	5.09	2.00	3.00	3.00	7.99	6.81	4.09	0.47	27.36
Grass Pasture		9144.0	73.04	2.58	3.78	5.16	7.20	5.91	3.74	1.22	29.59
Seed		451.0	3.60	0.75	1.85	4.10	7.20	6.70	4.30	1.50	26.40
Misc		203.0	1.62	2.00	4.50	5.40	6.60	5.20	3.80	1.40	28.90
Total acres		12519.0	100.00								
Total weighted IR - ac-in/ac				2.39	3.71	5.10	7.34	6.00	3.76	1.09	29.39
Total weighted IR - ac-ft/ac				0.20	0.31	0.43	0.61	0.50	0.31	0.09	2.45
Total AF				2494	3868	5325	7660	6248	3922	1135	30652
Rogue River Valley Irrigation District				April	May	June	July	Aug	Sept	Oct	Total
		Acres	% of area								
Crop											
Fruit - Apples,Pears,Cherries		882.0	10.18	2.12	4.10	6.20	8.65	7.20	4.38	0.95	33.60
Alfalfa Hay		394.0	4.55	2.05	3.50	4.84	6.73	5.59	3.46	0.00	26.17
Grains		166.0	1.92	1.70	4.08	5.04	6.50	0.65	0.00	0.00	17.97
Vegetables/turf/etc.		440.0	5.08	2.00	3.00	3.00	7.99	6.81	4.09	0.47	27.36
Grass Pasture		6327.0	73.04	2.58	3.78	5.16	7.20	5.91	3.74	1.22	29.59
Seed		312.0	3.60	0.75	1.85	4.10	7.20	6.70	4.30	1.50	26.40
Misc		141.0	1.63	2.00	4.50	5.40	6.60	5.20	3.80	1.40	28.90
Total Acres		8662.0	100.00								
Total weighted IR- ac-in/ac				2.39	3.71	5.10	7.34	6.00	3.76	1.09	29.39
Total weighted IR - ac-ft/ac				0.20	0.31	0.43	0.61	0.50	0.31	0.09	2.45
Total AF				1723	2677	3685	5300	4322	2714	786	21207
1/ From: "Oregon Crop Water Use & Irrigation Requirements", OSU Extension Misc 8530, March 199											
SUMMARY - ET, IR & Effective Precip											
				April	May	June	July	Aug	Sept	Oct	Total
Talent ID - 16309 acres											
Total weighted ET - ac-in/ac				3.48	5.07	6.24	7.65	6.34	4.59	2.71	36.08
Total weighted IR - ac-in/ac				2.35	3.80	5.37	7.52	6.19	3.86	1.02	30.11
Effective Precip (ET minus IR)				1.13	1.27	0.87	0.13	0.15	0.73	1.69	5.97
Medford ID - 12519 acres											
Total weighted ET - ac-in/ac				3.43	4.92	6.04	7.45	6.10	4.43	2.68	35.05
Total weighted IR - ac-in/ac				2.39	3.71	5.10	7.34	6.00	3.76	1.09	29.39

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HandR Engineering
July 5, 2002

Effective Precip (ET minus IR)			1.04	1.21	0.94	0.11	0.10	0.67	1.59	5.66
RRVID - 8662 acres										
Total weighted ET - ac-in/ac			3.43	4.91	6.04	7.46	6.10	4.43	2.68	35.05
Total weighted IR- ac-in/ac			2.39	3.71	5.10	7.34	6.00	3.76	1.09	29.39
Effective Precip (ET minus IR)			1.04	1.20	0.94	0.12	0.10	0.67	1.59	5.66
COMPARE Effective Precip and Average Precip										
Weighted Effective Precip (37490 acres)			1.08	1.23	0.91	0.12	0.12	0.70	1.63	5.79
(represents ET minus IR)										
Ave Precip (OSU/Medford Exp. Sta. - 1948-1989)			1.18	1.28	0.92	0.29	0.43	0.88	1.90	6.88
Ave Precip (OSU/Medford Exp. Sta. - 1980-2001)			1.69	1.38	0.87	0.36	0.47	0.68	1.45	6.90
NOTES										
ET represents crop evapotranspiration. IR represents crop irrigation requirement. IR does not include seasonal on-farm										
irrigation application efficiency.										
Rather than recalulate crop ET and IR using short term weather data, or use the short term research data from BOR study										
(i.e. Jerry Buchheim), published data was used (i.e. OSU Misc 8530). It was felt this source of data could be well supported as being										
long term data. Values displayed here may be different than that displayed in the Water Management / Conservation Plans.										
Data used in those Plans came from the BOR study. It is felt that data represents a rather short period of years.										
Data used in this analysis represents long term weather data, i.e. 30 years or more.										
IR values presented here does not include any credit for winter soil moisture carryover into the start of the growing season.										
Year by year ET & IR values are generally growing season climate related and not related to high or low water supply years.										
For example, a low water supply year does not mean a low IR and a high water supply year does not mean a high IR, or visa versa.										
However, a low water supply year can be a low IR year if delivery is reduced during the season or cutoff to the user during the growing.										
season. And however, a high water supply year generally is not a high IR year, unless the average year delivery represents										
a deficit delivery situation, and a high water supply year then represents higher on-farm delivery resulting in higher crop yields.										

prepared by Elwin Ross
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